

Road & Railroad Crossing Inventory Mauvais & Big Coulee



**Bureau of Reclamation
Dakotas Area Office**

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INTRODUCTION

The Bureau of Reclamation's Dakotas Area Office and the North Dakota State Water Commission are working together in an effort to assist the Devils Lake Joint Water Resources Board in the development and implementation of a sub-basin water management plan for the Mauvais Coulee/Big Coulee watershed. The Board requested that an inventory survey be done on all road/railroad crossings on the main channel upstream of Lake Irvine. The inventory survey was completed by the Bureau of Reclamation with funding through Reclamation's Technical Assistance to States (TATS) program.

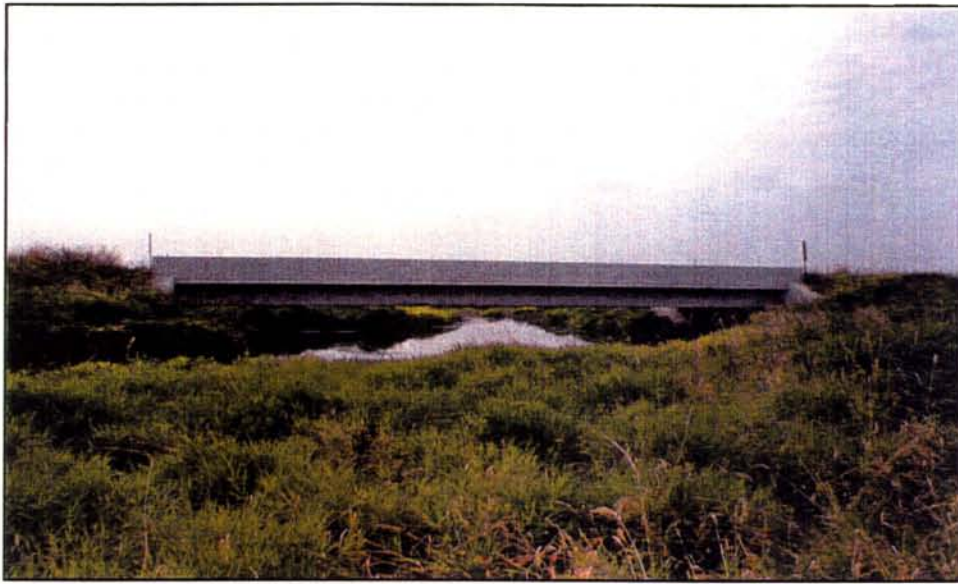
Bureau of Reclamation surveyors collected data on the main channel of Mauvais Coulee/Big Coulee recording the location of each crossing, the size and type of bridge or culvert, the inlet and outlet invert elevations, top of grade elevation, and relative condition of the structure. The field work was conducted in July, August and September of 1998, and in August and September of 1999.

This report includes maps of the crossing locations, digital photographs of downstream, upstream and center of road or railroad, survey data of the bridge deck, culvert sizes and lengths, relative condition, invert elevations, and channel elevations; in North Dakota State Plane Coordinates, North Zone, NAD 27 and elevations in NGVD 29 at all crossings. Also, a table of all recorded bench marks and temporary bench marks used in the survey control network for this project is included. The state plane coordinates, latitudes, longitudes and elevations for each bench mark are listed.

In an effort to establish comparable elevations throughout the Devils Lake area the State Water Commission has established a new local datum (refer to SWC letter dated 7-28-99) for the Devils Lake area. The new datum, SWC99, is based on the NAD 27 datum.

The Bureau of Reclamation survey crew held the elevation of SWC99 fixed point "B 66" to assure this survey would conform to the SWC99 datum. All surveys were performed using G.P.S. fast static and RTK survey methods. Temporary bench marks established by the Bureau of Reclamation for this project are marked by 5/8" rebar with plastic caps stamped "USBR".

Reclamation is able to provide this assistance to the Board and State Water Commission through its Technical Assistance program. The Technical Assistance program allows Reclamation to provide assistance to state agencies in water management evaluations they are conducting, at no cost to the state agency. The mission of the Reclamation's Dakotas Area Office is to provide technical assistance and leadership in the responsible development and management of water and related resources to enhance the quality of life in North Dakota and South Dakota. This project is an excellent example of how Reclamation is accomplishing its mission.



M1 Upstream side of concrete bridge on Maza road, in good condition,
Section 36 & 2, T157 & 156N, R66W, N 503009.91, E 2338124.55,
Elevation 1438.2 @ ∇ of coulee.



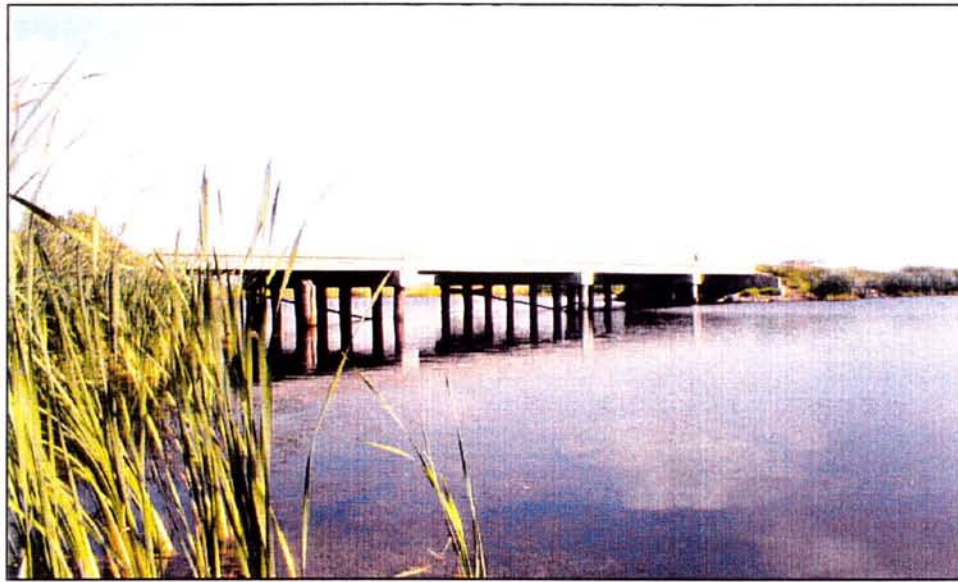
M1 Downstream side of concrete bridge on Maza road, in good condition,
Section 36 & 2, T157 & 156N, R66W, N 502979.46, E 2338124.89,
Elevation 1438.6 @ ∇ of coulee.



M1 Center of concrete bridge on Maza road, in good condition, 30.0' wide & 72.0' long, Section 36 & 2, T157 & 156N, R66W, N 502994.78 E 2338124.66, Elevation 1452.9 @ center of bridge.



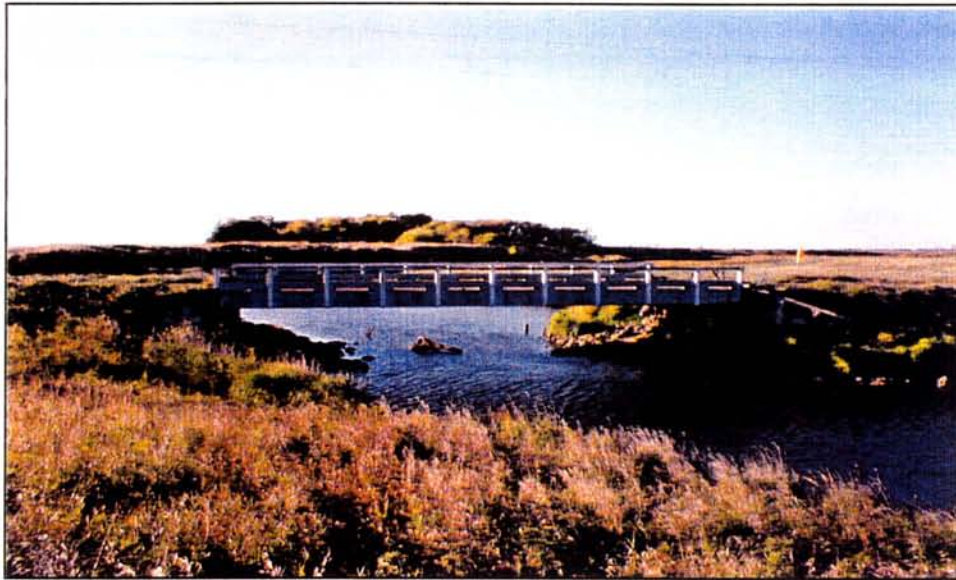
M2 Upstream side of concrete bridge, in fair condition, 8 feet of water (8-11-98), Section 25 & 36, T157N, R66W, N 508282.80, E 2337598.17, Elevation 1436.6 @ ∇ of Coulee.



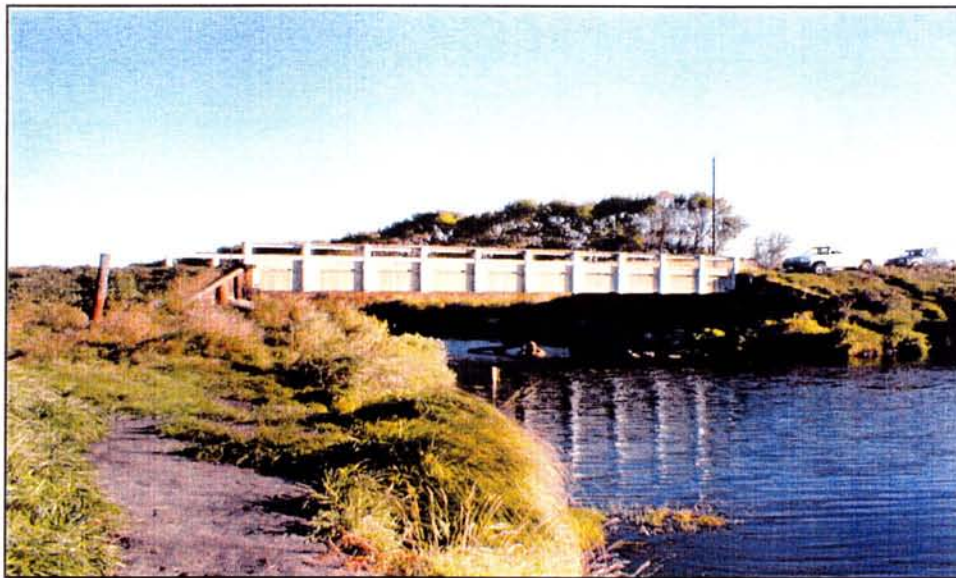
M2 Downstream side of concrete bridge, in fair condition, 7.7 feet of water (8-11-98), Section 25 & 36, T157N, R66W, N 508259.25, E 2337598.51, Elevation 1436.9 @ ∇ of Coulee.



M2 Center of concrete bridge, in fair condition, looking west, 22.4' wide & 132.0' long, Section 25 & 36, T157N, R66W, N 508271.15, E 2337598.72, Elevation 1452.1 @ center of bridge.



M3 Upstream side of concrete bridge, in good condition, 7.0 feet of water (9-30-98), Section 7 & 18, T157N, R65W, N 524176.01, E 2340888.12, Elevation 1438.6 @ Φ of coulee.



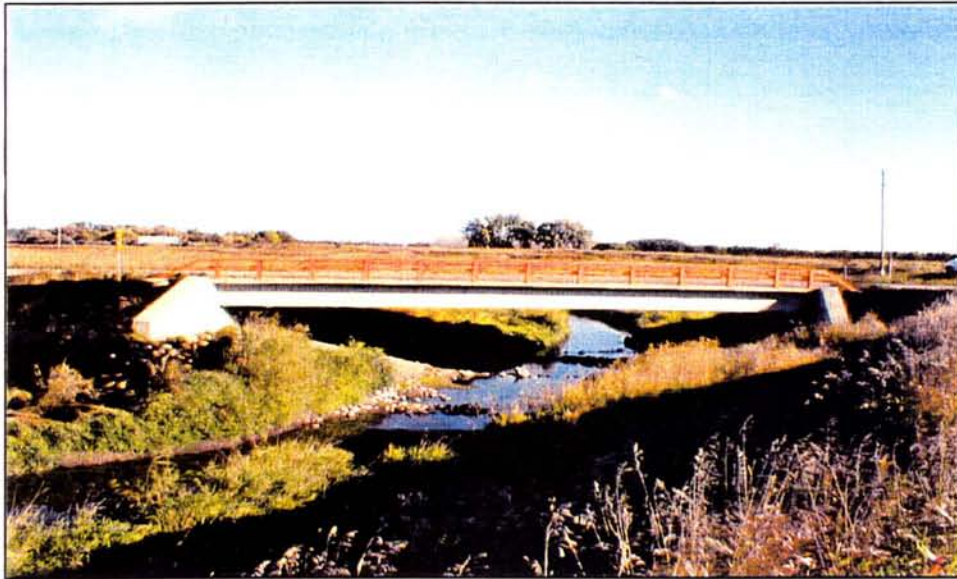
M3 Downstream side of concrete bridge in good condition, 5.1 feet of water (9-30-98), Section 7 & 18, T157N, R65W, N 524144.54, E 2340890.60, Elevation 1440.5 @ Φ of coulee.



M3 Center of concrete bridge, in good condition, looking west, 30.3 wide & 59.8 long, Section 7 & 18, T157N, R65W, N 524160.21, E 2340889.39, Elevation 1456.5 @ center of bridge.



M4 Upstream side of concrete bridge, in good condition, 0.5 feet of water (9-30-98), Section 6 & 7, T157N, R65W, N 529446.70, E 2339970.77, Elevation 1444.7 @ Φ of coulee.



M4 Downstream side of concrete bridge, in good condition, 1.0 foot of water, (9-30-98), Section 6 & 7, T157N, R65W, N 529415.68, E 2339960.63, Elevation 1444.2 @ \perp of coulee.



M4 Center of concrete bridge, in good condition, looking west, 32.5 feet wide & 74.6 feet long, Section 6 & 7, T157N, R65W, N 529431.30, E 2339965.46, Elevation 1461.1 @ center of bridge.



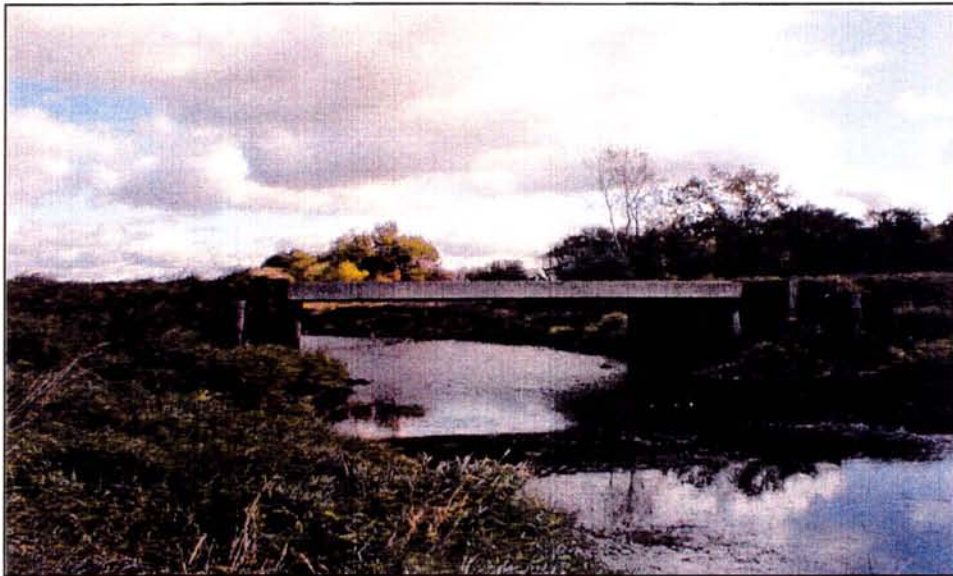
M5 Upstream side of four 72" CMP's, in good condition, 0.5 foot of water (9-30-98), Section 30 & 31, T158N, R65W, east to west N & E,
 N 540047.07, E 2340752.70, Elevation 1453.3 @ invert of CMP,
 N 540047.67, E 2340744.94, Elevation 1453.6 @ invert of CMP,
 N 540048.75, E 2340728.62, Elevation 1452.6 @ invert of CMP,
 N 540049.17, E 2340718.25, Elevation 1453.1 @ invert of CMP.



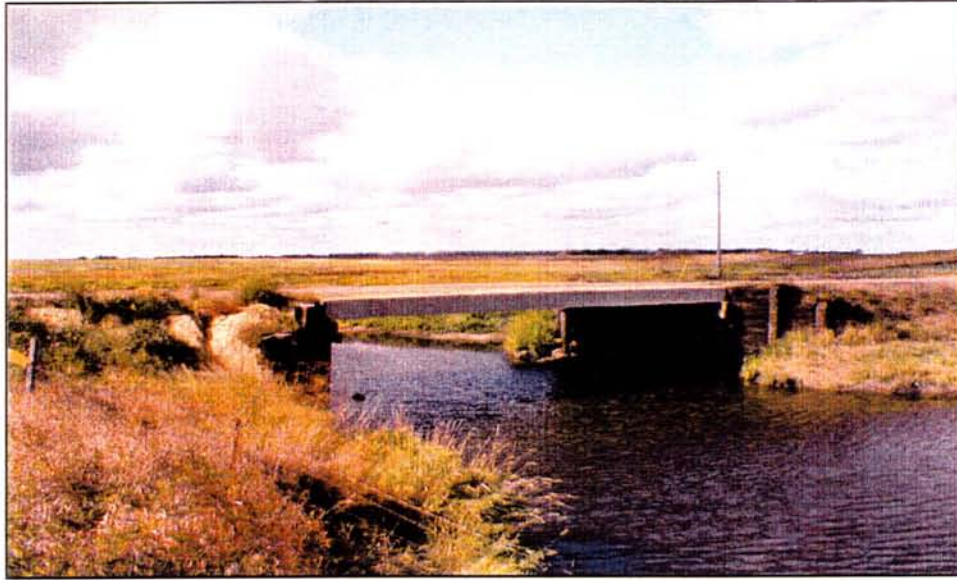
M5 Downstream side of four 72" CMP's, in good condition, 1.0 foot of water (9-30-98), Section 30 & 31, T158N, R65W, east to west N & E,
 N 540003.18, E 2340749.39, Elevation 1453.3 @ invert of CMP,
 N 540004.26, E 2340740.00, Elevation 1453.2 @ invert of CMP,
 N 540004.67, E 2340730.30, Elevation 1452.8 @ invert of CMP,
 N 540004.85, E 2340719.56, Elevation 1453.6 @ invert of CMP.



M5 Center of road crossing of four 72" CMP's, looking west, Section 30 & 31, T158N, R65W, N 540025.35, E 2340734.44, Elevation 1459.6 @ center of road.



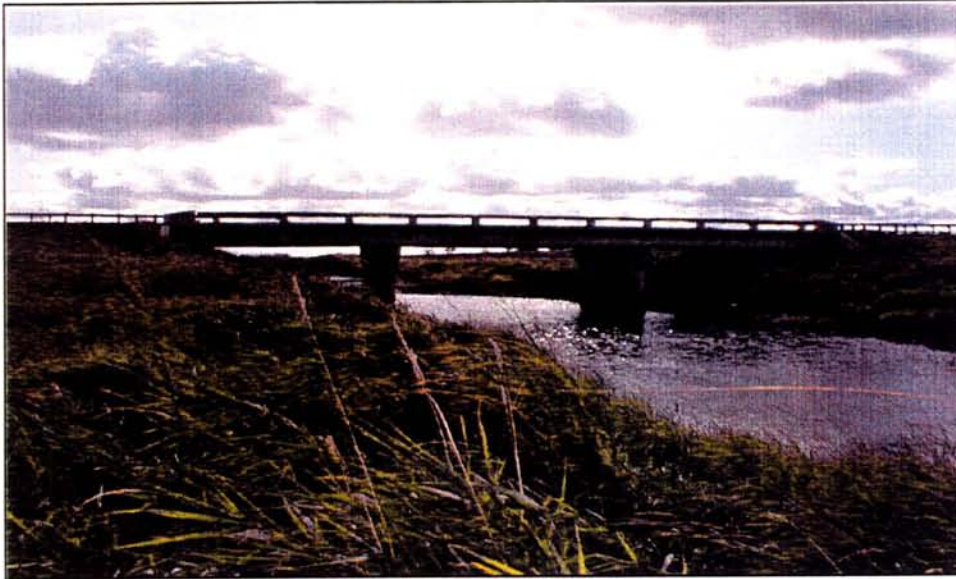
M6 Upstream side of concrete & wood bridge, in fair condition, 6.0 feet of water (9-30-98), Section 25 & 30, T158N, R65 & 66W, N 542470.75, E 2339421.08, Elevation 1449.2 @ Φ of coulee.



M6 Downstream side of concrete & wood bridge, in fair condition, 6.0 feet of water (9-30-98), Section 25 & 30, T158N, R65 & 66W, N 542470.54, E 2339445.34, Elevation 1449.5 @ ∇ of coulee.



M6 Center of concrete & wood bridge, looking north, in fair condition, 24.0 wide & 45.2 long, Section 25 & 30, T158N, R65 & 66W, N 542469.94, E 2339433.28, Elevation 1467.0 @ center of bridge.



M7 Upstream side of concrete bridge on N.D. Hwy. 17, in good condition, 4.6 feet of water (9-30-98), Section 24 & 25, T158N. R66W, N 545264.79, E 2336722.34, Elevation 1451.1 @ center of bridge.



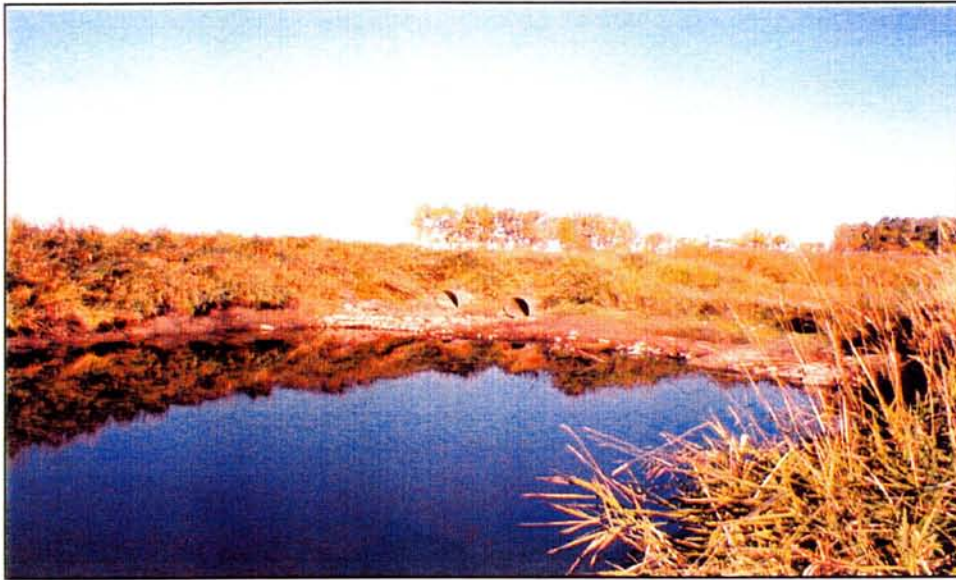
M7 Downstream side of concrete bridge on N.D. Hwy. 17, in good condition, 3.9 feet of water (9-30-98), Section 24 & 25, T158N, R66W, N 545229.41, E 2336723.85, Elevation 1451.8 @ center of bridge.



M7 Center of concrete bridge on N.D Hwy. 17, looking west, in good condition, 35.7' wide & 95.0' long, Section 24 & 25, T158N, R66W, N 545246.95, E 2336723.12, Elevation 1469.9 @ center of bridge.



M8 Upstream side of two 30"x42" CMP's, in good condition, no water, Section 13 & 24, T158N, R66W, N 550513.24, E 2334611.67, Elevation 1457.9 @ invert of east CMP, N 550512.31, E 2334602.43, Elevation 1458.2 @ invert of west CMP.



M8 Downstream side of two 30" x 42" CMP's, in good condition, no water, (10-1-98), Section 13 & 24, T158N, R66W, N 550482.49, E 2334612.12, Elevation 1457.9 @ invert of east CMP, N 550481.13, E 2334602.44, Elevation 1458.2 @ invert of west CMP.



M8 Center of trail at two 30" x 42" CMP's, looking west, Section 13 & 24, T158N, R66W, N 550496.24, E 2334607.07, Elevation 1461.0 @ center of trail.



M9 Upstream side of two 36" CMP's, in good condition, 0.1 foot of water (10-1-98), Section 14 & 23, T158 N, R66W, N 550473.42, E 2333869.66, Elevation 1457.5 @ invert of east CMP, N 550471.26, E 2333860.99, Elevation 1457.5 @ invert of west CMP.



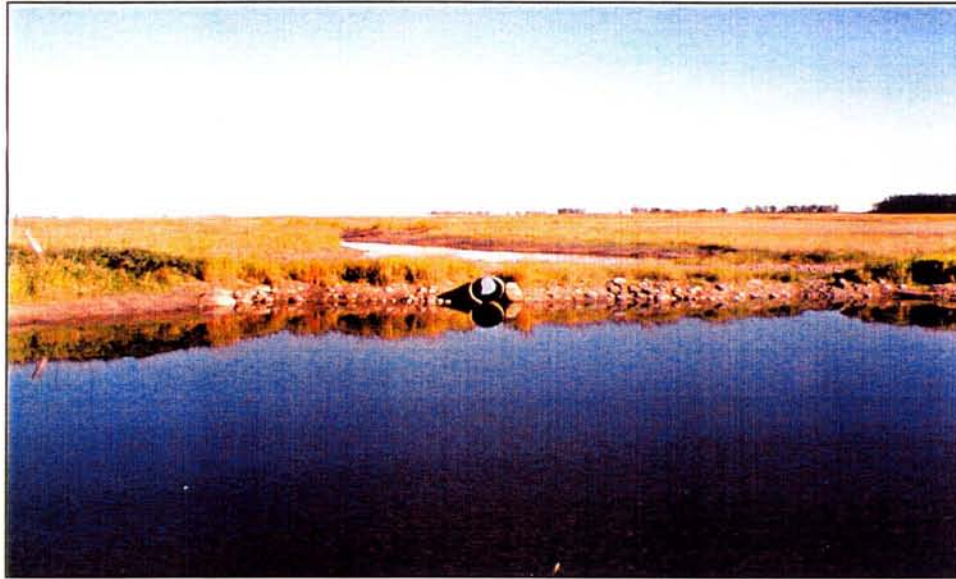
M9 Downstream side of two 36" CMP's, in good condition, no water (10-1-98), Section 14 & 23, T158N, R66W, N550503.44, E 2333877.58, Elevation 1457.4 @ invert of east CMP, N 550504.78, E 2333867.93, Elevation 1457.7 @ invert of west CMP.



M9 Center of trail crossing of two 36" CMP's, looking west, Section 14 & 23, T158N, R66W, N 550488.37, E 2333868.61, Elevation 1460.8 @ center of trail.



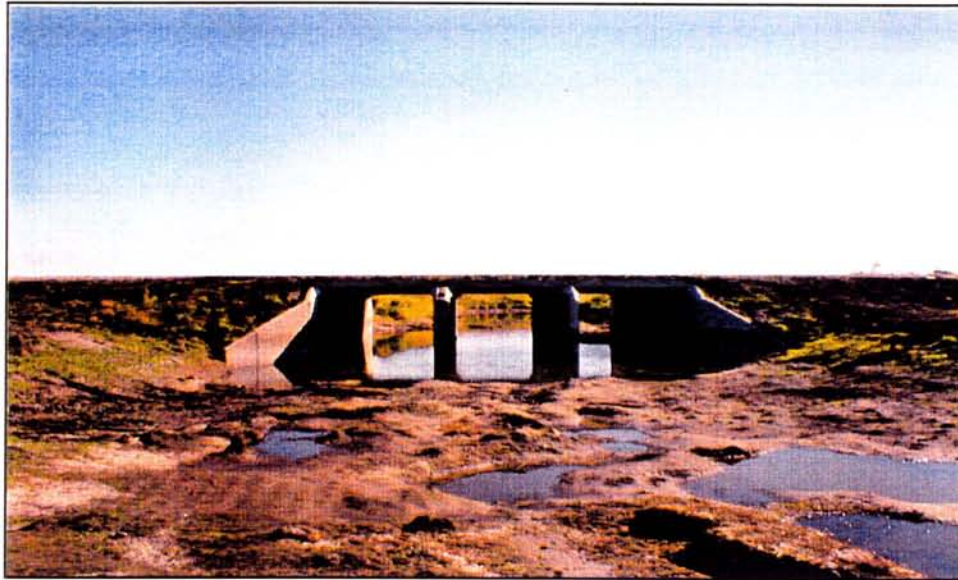
M10 Upstream side of one 36" CMP, in good condition, 0.1 foot of water (10-1-98), Section 14 & 23, T158N, R66W, N 550510.13, E 2332622.09, Elevation 1458.9 @ invert of CMP.



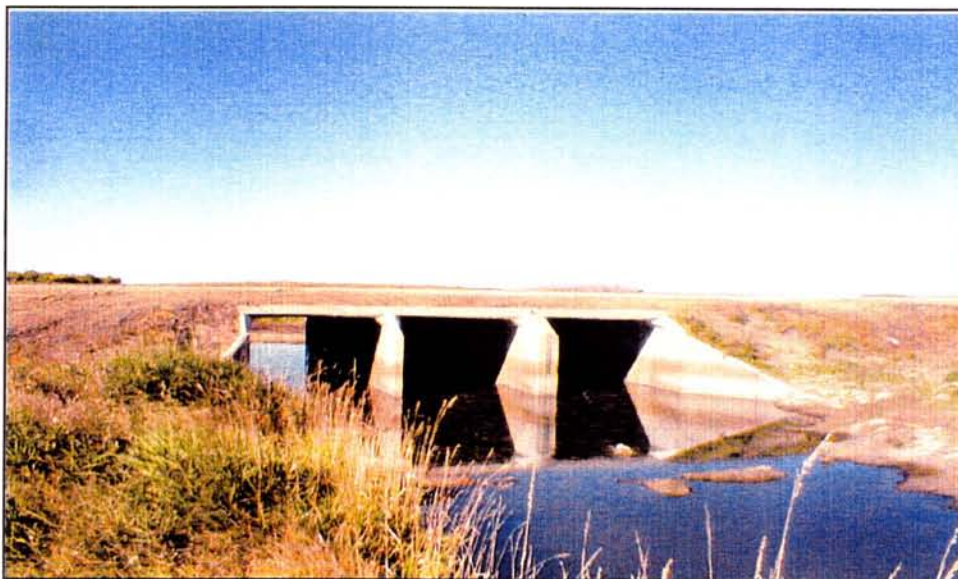
M10 Downstream side of one 36" CMP, in good condition, 0.1 foot of water (10-1-98), Section 14 & 23, T158N, R66W, N 550470.00, E 2332618.64, Elevation 1459.0 @ invert of CMP.



M10 Center of trail crossing of one 36" CMP, looking west, Section 14 & 23, T158N, R66W, N 550490.48, E 2332620.84, Elevation 1461.7 @ center of trail.



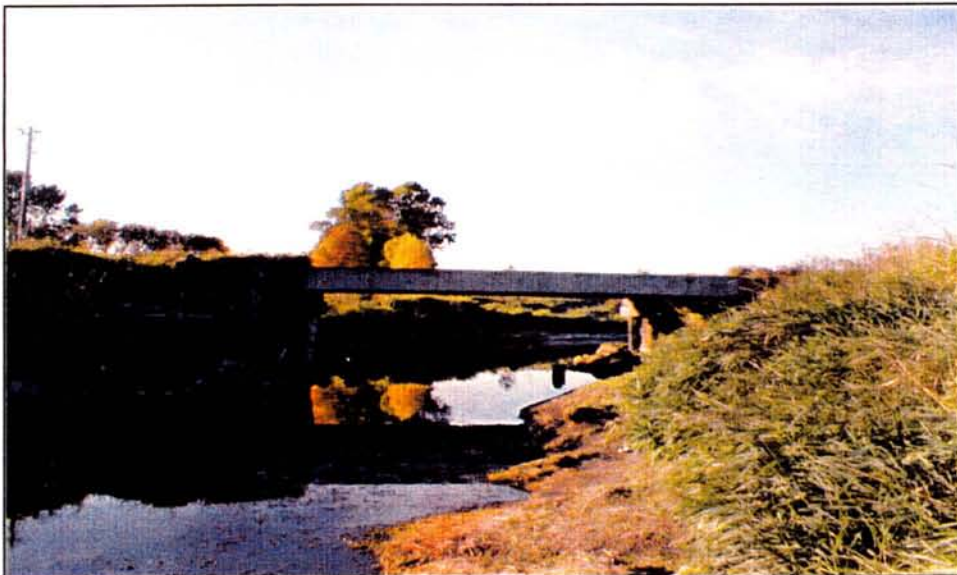
M11 Upstream side of 3 cell 10.5' high box culvert, in new condition, 1.5 feet of water (10-1-98), Section 10 & 11, T158N, R66W, N 556413.54, E 2328612.24, Elevation 1460.7 @ ∇ of coulee.



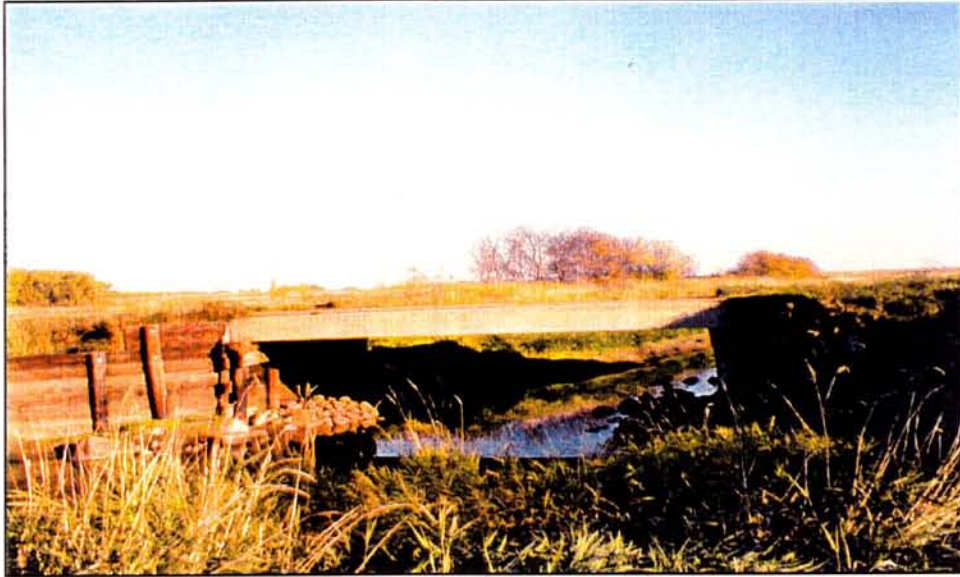
M11 Downstream side of 3 cell 10.5' high box culvert, in new condition, 2.0 feet of water (10-1-98), Section 10 & 11, T158N, R66W, N 556414.07, E 2328665.90, Elevation 1460.2 @ ∇ of coulee.



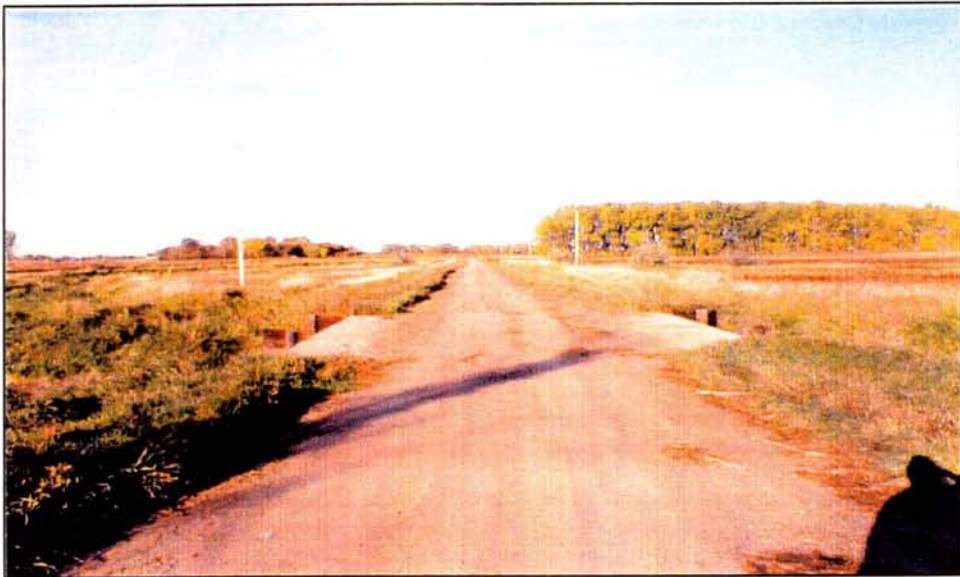
M11 Center of road crossing of box culvert, looking north 54.5 feet wide & 39.9 feet long, Section 10 & 11, T158N, R66W, N 556415.02, E 2328638.97, Elevation 1473.3 @ center of road.



M12 Upstream side of concrete & wood bridge, in fair condition, 3 feet of water (10-2-98), Section 9, T158N, R66W, N 558986.71, E 2319971.78, Elevation 1465.0 @ Φ of coulee.



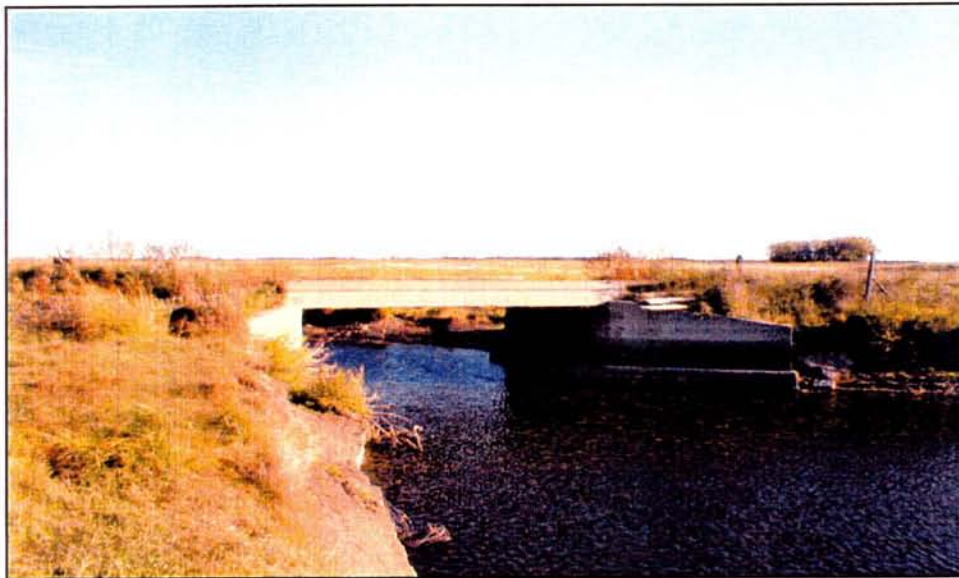
M12 Downstream side of concrete & wood bridge, in fair condition, 3.5 feet of water (10-2-98), Section 9, T158N, R66W, N 559009.79, E 2319970.89, Elevation 1464.5 @ Φ of coulee.



M12 Center of concrete & wood bridge, looking west, in fair condition, 24 feet wide & 34 feet long, Section 9, T158N, R66W, N 558997.87, E 2319970.95, Elevation 1477.7 @ center of bridge.



M13 Upstream side of concrete bridge, in poor condition, 2.8 feet of water (10-2-98), Section 33 & 4, T158 & 159N, R66W, N 566166.44, E 2322347.49, Elevation 1469.1 @ ∇ of coulee.



M13 Downstream side of concrete bridge, in poor condition, 4.7 feet of water (10-2-98), Section 33 & 4, T158 & 159N, R66W, N 566147.22, E 2322348.38, Elevation 1467.2 @ ∇ of coulee.



M13 Center of concrete bridge looking west, in poor condition, 19.2 feet wide, 24.5 feet long, Section 33 & 4, T158 & 159N, R66W, N 566156.95, E 2322347.76, Elevation 1480.1 @ center of bridge.



M14 Upstream side of concrete bridge, in fair condition, no water (10-2-98), Section 27 & 34, T159N, R66W, N 571491.56, E 2324231.93, Elevation 1474.7 @ Φ of coulec.



M14 Downstream side of concrete bridge, in fair condition, no water (10-2-98), Section 27 & 34, T159N, R66W, N 571468.90, E 2324232.13, Elevation 1474.5 @ ∇ of coulee.



M14 Center of concrete bridge in fair condition, looking west, 22.5 feet wide & 24 feet long, Section 27 & 34, T159N, R66W, N 571480.01, E 2324231.88, Elevation 1484.0 @ center of bridge.



M15 Upstream side of 72" CMP located 172 ft. east of bridge, in good condition, no water (10-2-98), Section 27 & 34, T159N, R66W, N 571509.02, E 2324400.66, Elevation 1476.2 @ invert of CMP.



M15 Downstream side of 72" CMP located 172 ft. east of bridge, in good condition, no water (10-2-98), Section 27 & 34, T159N, R66W, N 571455.12, E 2324403.74, Elevation 1476.4 @ invert of CMP.



M15 Center of road crossing, 72" CMP located 172 feet east of bridge, looking west, Section 27 & 34, T159N, R66W, N 571481.75, E 2324402.17, Elevation 1484.1 @ center of road.



M16 Upstream side of concrete bridge, in poor condition, 4.1 feet of water (7-30-99), Section 21 & 28, T159N, R66W, N 576735.45, E 2322663.57, Elevation 1468.9 @ Φ of coulee.



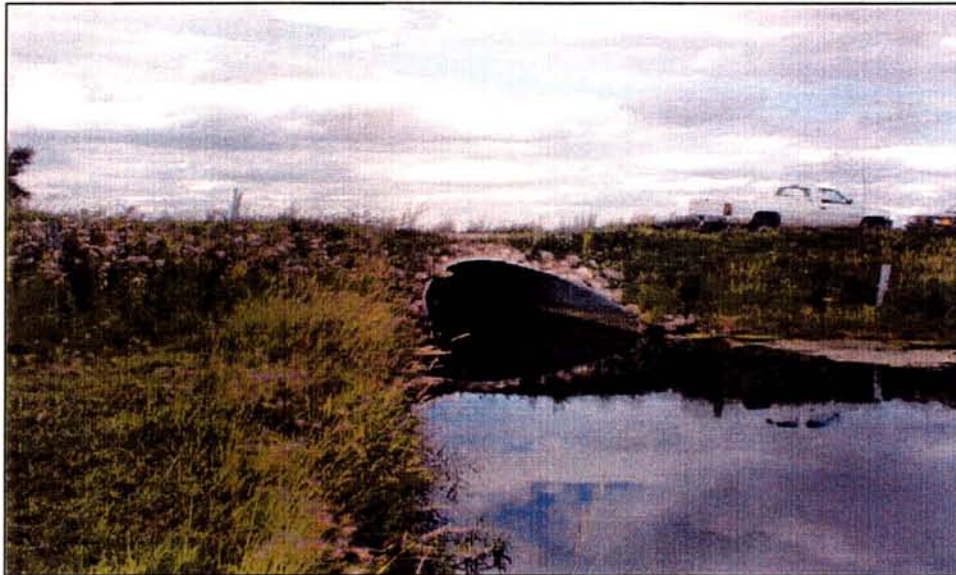
M16 Downstream side of concrete bridge, in poor condition, 6.1 feet of water (7-30-99), Section 21 & 28, T159N, R66W, N 576714.72, E 2322662.97, Elevation 1467.7 @ ∇ of coulee.



M16 Center of concrete bridge, in poor condition, looking east, 20 feet wide & 18 feet long, Section 21 & 28, T159N, R66W, N 576725.05, E 2322663.06, Elevation 1485.4 @ center of bridge.



M17 Upstream side of one 96" CMP, in new condition, 3.3 feet of water (7-30-99), Section 16 & 21 T159N, R66W, N 582012.88, E 2321083.21, Elevation 1472.7, @ invert of CMP.



M17 Downstream side of one 96" CMP, in new condition, 3 feet of water (7-30-99), Section 16 & 21 T159N, R66W, N 581979.19, E 2321084.17, Elevation 1473.1 @ invert of CMP.



M17 Center of road crossing at 96" CMP, looking west, Section 16 & 21, T159N, R66W, N 581993.72, E 2321084.31, Elevation 1490.9 @ center of road crossing.



M18 Upstream side of two 48" CMP's, in good condition, 3.9 feet & 3.5 feet of water (7-30-99), Section 17 & 16, T159N, R66W, N 586368.74, E 2317541.46, Elevation 1485.9, @ invert of south CMP, N 586388.61, E 2317539.22, Elevation 1486.3 @ invert of north CMP.



M18 Downstream side of two 48" CMP, in good condition, 2.7 & 3 feet of water (7-30-99), Section 17 & 16, T159N, R66W, N 586366.32, E 2317580.33, Elevation 1487.1, @ invert of south CMP, N 586388.17, E 2317578.60, Elevation 1486.8 @ invert of north CMP.



M18 Center of road crossing, between two 48" CMP's, looking north, Section 17 & 16, T159N, R66W, N 586376.10, E 2317559.58, Elevation 1491.6 @ center of road crossing between CMP's.



M19 Center of road crossing, may have CMP, under water & mud, could not locate, located 170 feet north of M18 CMP, looking north, Section 17 & 16, T159N, R66W, N 586562.90, E 2317557.79, Elevation 1490.1 @ center of road crossing, between water.



M20 Upstream side of one 36" CMP, in good condition, 1.4 feet of water (8-2-99), Section 9 & 16, T159N, R66W, N 587237.23, E 2317575.64, Elevation 1488.5 @ invert of CMP.



M20 Downstream side of one 36" CMP, in good condition, 1.7 feet of water (8-2-99), Section 9 & 16, T159N, R66W, N 587192.06, E 2317576.01, Elevation 1488.2 @ invert of CMP.



M20 Center of road crossing, on 36" CMP, CMP is east of intersection looking west, Section 9 & 16, T159N, R66W, N 587214.77, E 2317578.11, Elevation 1495.7 @ center of road crossing.



M21 Upstream side of one 48" CMP, in good condition, 0.9 foot of water (8-2-99), Section 8 & 16, T159N, R66W, N 587244.43, E 2317514.69, Elevation 1488.9 @ invert of CMP.



M21 Downstream side of one 48" CMP, in good condition, 1 foot of water (8-2-99), Section 8 & 16, T159N, R66W, N 587184.86, E 2317569.03, Elevation 1488.8 @ invert of CMP.



M21 Center of road crossing on one 48" CMP, looking north, CMP runs N-W to S-E diagonal, Section 8 & 16, T159N, R66W, N 587215.06, E 2317546.55, Elevation 1495.5 @ center of road crossing.



M22 Upstream side of one 96" CMP, in good condition, 1.3 feet of water (8-2-99), Section 8 & 17, T159N, R66W, N 587223.53, E 2317085.55, Elevation 1488.0 @ invert of CMP.



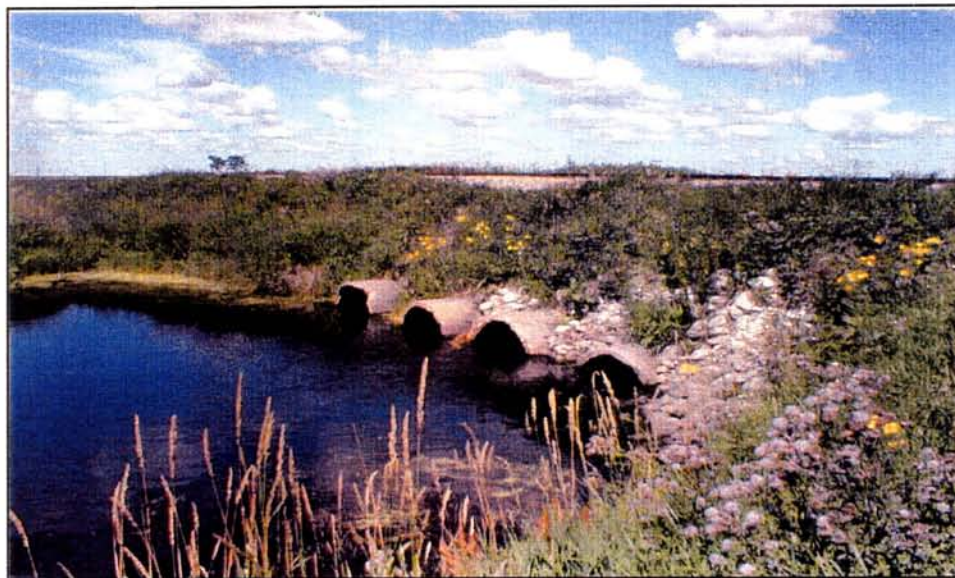
M22 Downstream side of one 96" CMP, in good condition, 1.4 feet of water (8-2-99), Section 8 & 17, T159N, R66W, N 587190.80, E 2317088.75, Elevation 1488.0 @ invert of CMP.



M22 Center of road crossing of one 96" CMP looking west, Section 8 & 17, T159N, R66W, N 587207.81, E 2317086.39, Elevation 1497.0 @ center of road crossing.



M23 Upstream side of four 60" concrete pipes at railroad crossing, in fair condition, 4+ feet of water (8-3-99), Section 5, T159N, R66W, east to west northings & eastings, N 597290.43, E 2314325.38, Elevation 1499.0, N 597291.95, E 2314317.64, Elevation 1497.7, N 597292.77, E 2314312.72, Elevation 1497.5, N 597291.89, E 2314303.07, Elevation 1498.5 @ invert of 60" concrete pipes.



M23 Downstream side of four 60" concrete pipes at railroad crossing, in fair condition, 4+ feet of water (8-3-99), Section 5, T159N, R66W, east to west northings & eastings, N 597250.57, E 2314326.28, Elevation 1498.3, N 597250.98, E 2314319.13, Elevation 1497.9, N 597249.85, E 2314313.33, Elevation 1498.0, N 597250.99, E 2314305.05, Elevation 1498.0 @ invert of 60" concrete pipes.



M23 Center of railroad crossing of four 60" concrete pipes, in fair condition, looking west, Section 5, T159N, R66W, N 597271.50, E 2314315.91, Elevation 1509.9 @ ∇ of railroad.



M24 Upstream side of concrete bridge at N.D. Hwy. 66, in good condition, 1.8 foot of water, (8-3-99), Section 32 & 5, T160N & 159N, R66W, N 597778.92, E 2314000.49, Elevation 1500.4 @ ∇ of bridge.



M24 Downstream side of concrete bridge at N.D. Hwy. 66, in good condition, 1 foot of water (8-3-99), Section 32 & 5, T160N & 159N, R66W, N 597742.87, E 2314001.07, Elevation 1501.3 @ \perp of bridge.



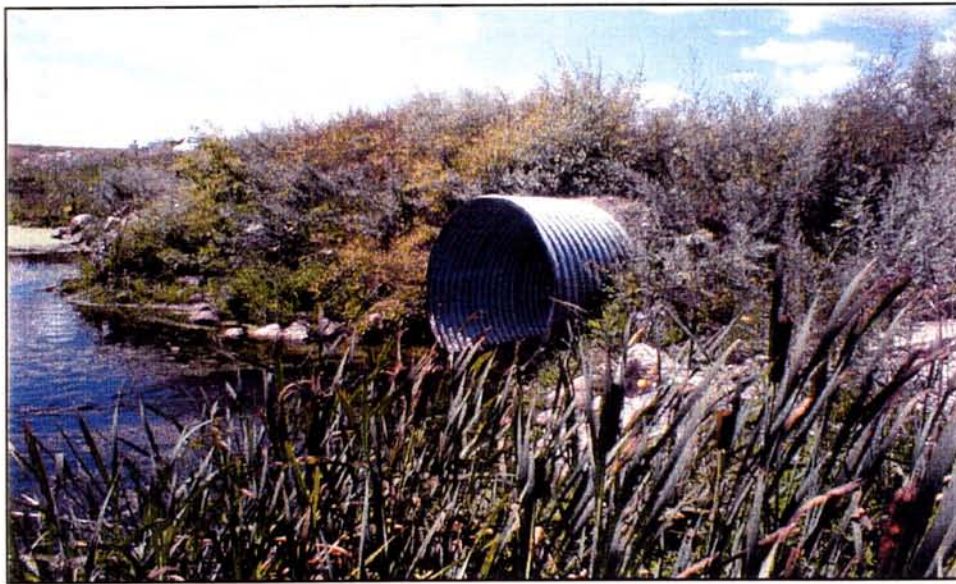
M24 Center of concrete bridge at N.D. Hwy. 66, looking east, in good condition, 36.4 feet wide & 85 foot long, Section 32 & 5, T160N & 159N, R66W, N 597760.14, E 2314001.27, Elevation 1509.4 @ \perp of bridge & N.D. Hwy. 66.



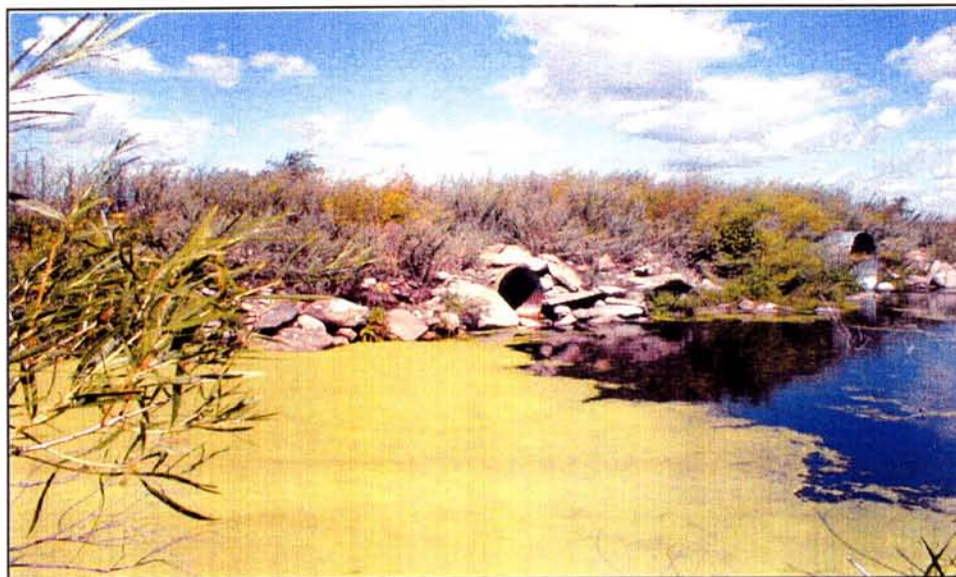
M25 Upstream side of one 72" CMP, in good condition, 0.8 foot of water (8-3-99), Section 20 & 29, T160N, R66W, N 608351.90, E 2313903.33, Elevation 1509.5 @ invert of CMP.



M25 Upstream side of one 48" CMP, in good condition, no water (8-3-99), Section 20 & 29, T160N, R66W, N 608348.96, E 2313864.04, Elevation 1510.5 @ invert of CMP.



M25 Downstream side of one 72" CMP, in good condition, 0.5 foot of water (8-3-99), Section 20 & 29, T160N, R66W, N 608306.70, E 2313906.04, Elevation 1509.7 @ invert of CMP.



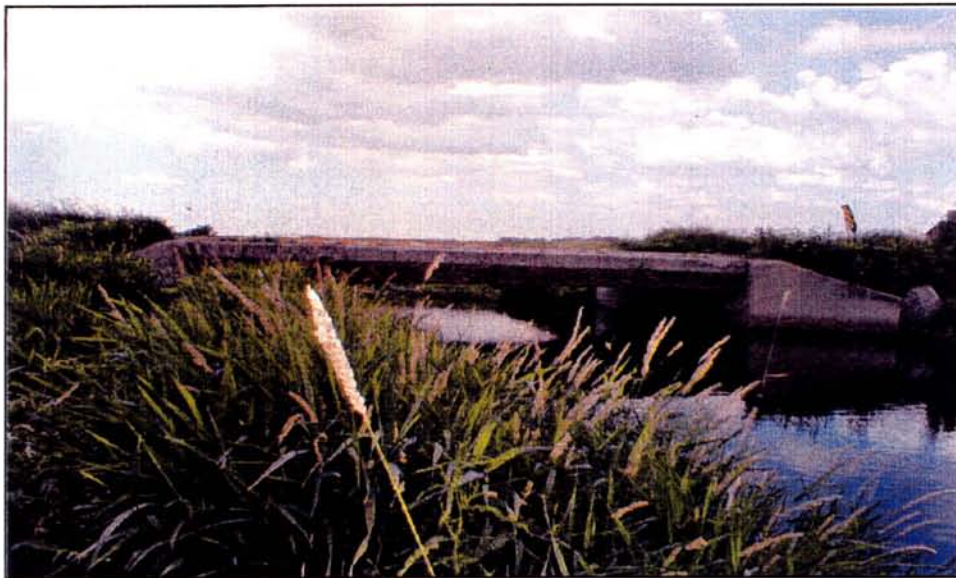
M25 Downstream side of one 48" CMP, in good condition, 1.1 foot of water (8-3-99), Section 20 & 29, T160N, R66W, N 608306.28, E 2313868.35, Elevation 1509.1 @ invert of CMP.



M25 Center of gravel road, of 48" CMP and 72" CMP, looking east,
Section 20 & 27, T160N, R66W, N 608328.14, E 2313865.75, Elevation
1517.1 @ center of gravel road and 48" CMP, N 608328.94,
E 2313904.20, Elevation 1517.3 @ center of gravel road and 72" CMP.



B1 Upstream side of concrete bridge, in fair condition, 4 feet of water (8-4-99), Section 8 & 9, T158N, R66W, N 557634.84, E 2318050.82, Elevation 1467.0 @ ∇ of Coulee & Bridge.



B1 Downstream side of concrete bridge, in fair condition, 4.8 feet of water (8-4-99), Section 8 & 9, T158N, R66W, N 557634.52, E 2318068.81, Elevation 1466.3 @ ∇ of Coulee Bridge.



B1 Center of concrete bridge, in fair condition, looking north, 18 feet wide, 31.5 feet long, Section 8 & 9, T158N, R66W, N557634.79, E 2318060.19, Elevation 1476.7 @ center of bridge and gravel road.



B2 Upstream side of concrete bridge at U.S. Hwy. 281, in good condition, 2.2 feet of water (8-4-99), Section 5 & 6, T158N, R66W, N 563694.30, E 2312654.58, Elevation 1473.4 @ Φ of bridge.



B1 Downstream side of concrete bridge at U.S. Hwy. 281, in good condition, 1.3 feet water (8-4-99), Section 5 & 6, T158N, R66W, N 563696.53, E 2312690.38, Elevation 1474.4 @ ∇ of bridge.



B2 Center of concrete bridge in good condition, looking north, 37.5 feet wide and 42.2 feet long, Section 5 & 6, T158N, R66W, N 563696.30, E 2312671.61, Elevation 1484.1 @ ∇ of bridge and U.S. Hwy 281.



B3 Upstream side of one 102" CMP, in good condition, 2.7 feet of water, (8-17-99) Section 31 & 6, T158 & 159N, R66W, N 566008.56, E 2310600.80, Elevation 1475.3 @ invert of one 102" CMP.



B3 Downstream side of one 102" CMP, in good condition, 2.5 feet of water, (8-17-99) Section 31 & 6, T158 & 159N, R66W, N 565973.67, E 2310596.70, Elevation 1475.7 @ invert of one 102" CMP.



B3 Center of gravel road, looking west, Section 31 & 6, T158 & 159N, R66W, N 565990.17, E 2310598.85, Elevation 1486.4 @ center of gravel road.



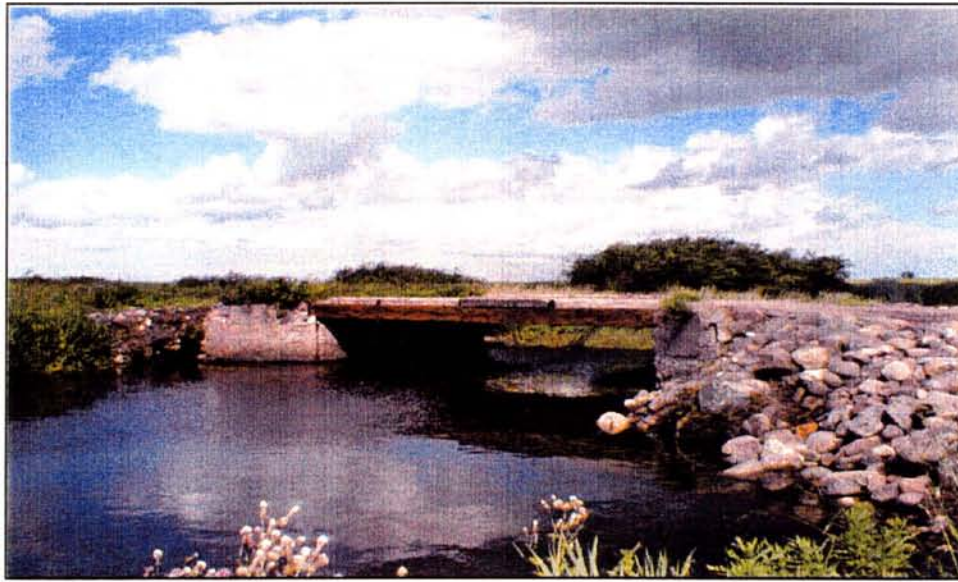
B4 Upstream side of one 48" CMP, in good condition, 0.3 foot of water (8-17-99), Section 25 & 36, T158 & 159N, N 571166.93, E 2302012.30, Elevation 1492.4 @ invert of 48" CMP.



B4 Downstream side of one 48" CMP, in good condition, 1.2 foot of water (8-17-99), Section 25 & 36, T159N, R67W, N 571126.86, E 2302011.91, Elevation 1491.3 @ invert of 48" CMP.



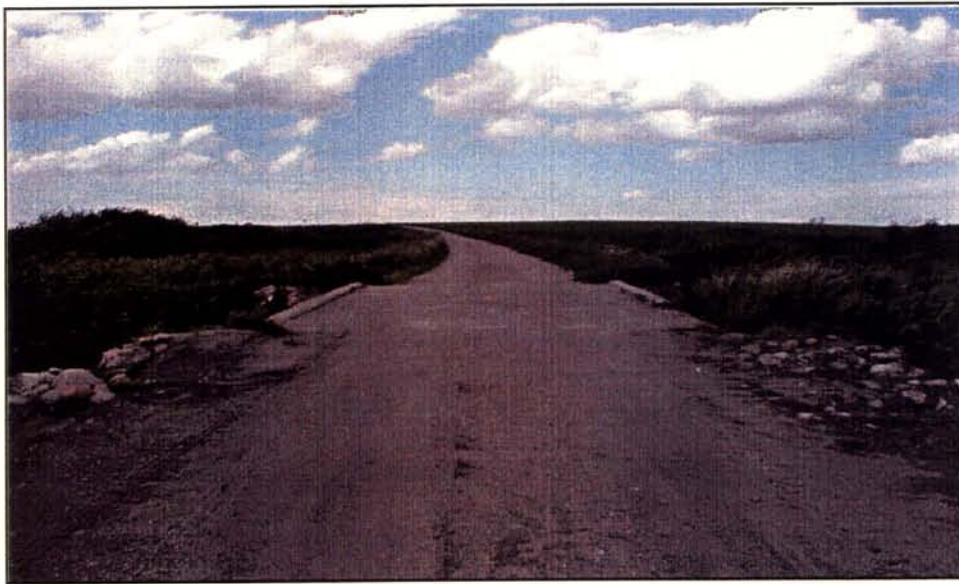
B4 Center of trail looking east, Section 25 & 36, T159N, R67W, N 571148.39, E 2302011.31, Elevation 1497.7 @ center of trail.



B5 Upstream side of concrete bridge, in fair condition, 7.5 feet of water (8-17-99), Section 23 & 24, T159N, R67W, N 580040.10, E 2301747.29, Elevation 1497.8 @ center of concrete bridge.



B5 Downstream side of concrete bridge, in fair condition, 6.7 feet of water (8-17-99), Section 23 & 24, T159N, R67W, N 580035.92, E 2301764.64, Elevation 1500.6 @ center of concrete bridge.



B5 Center of concrete bridge, 18' wide & 30' long, looking north, Section 23 & 24, T159N, R67W, N 580037.80, E 2301755.98, Elevation 1511.3 @ \perp of bridge.



B6 Upstream side of one 48" CMP, in good condition, 1.8 feet of water (8-18-99), Section 22 & 23, T159N, R67W, N 580593.33, E 296442.95, Elevation 1509.9 @ invert of CMP.



B6 Downstream side of one 48" CMP, in good condition, 2.5 feet of water (8-17-99), Section 22 & 23, T159N, R67W, N 580591.82, E 2296489.90, Elevation 1509.2 @ invert of CMP.



B6 Center of trail looking, south Section 22 & 23, T159N, R67W, N 580593.67, E 2296463.58, Elevation 1516.4 @ center of trail.



B7 Upstream side of wood & concrete bridge, in fair condition, 4.1 feet of water (8-18-99), Section 15 & 16, T159N, R67W, N 584162.61, E 2291103.93, Elevation 1514.8 @ ∇ of coulee.



B7 Downstream side of wood & concrete bridge, in fair condition, 3.9 feet of water (8-18-99), Section 15 & 16, T159N, R67W, N 584153.05, E 2291131.18, Elevation 1515.1 @ ∇ of coulee.



B7 Center of bridge in fair condition, looking north, 26.5' wide & 52' long, Section 15 & 16, T159N, R67W, N 584162.74, E 2291118.29, Elevation 1525.2 @ center of bridge.



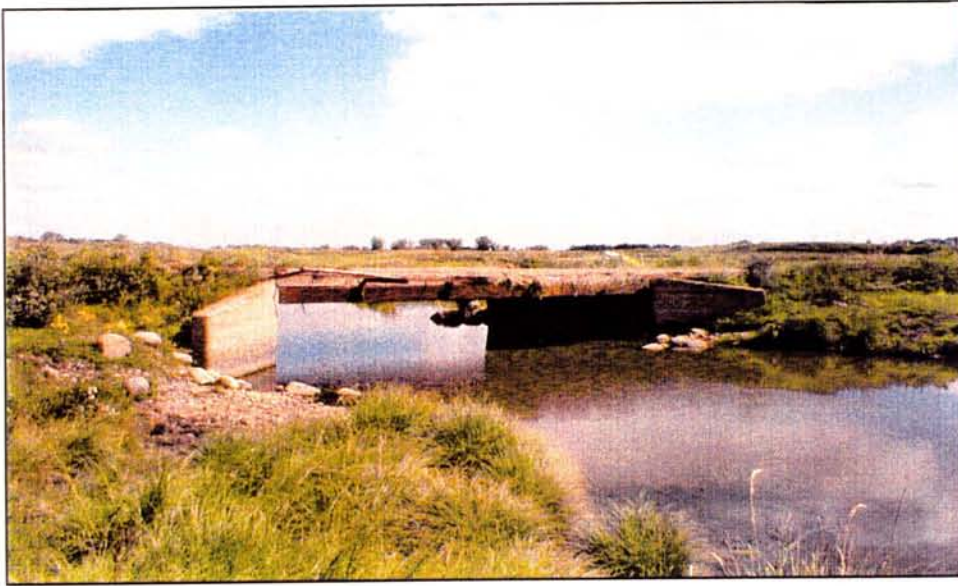
B8 Upstream side of concrete bridge, in good condition, 4.3 feet of water (8-18-99), Section 8 & 17, T159N, R67W, N 586739.58, E 2284847.15, Elevation 1524.2 @ ∇ of coulee.



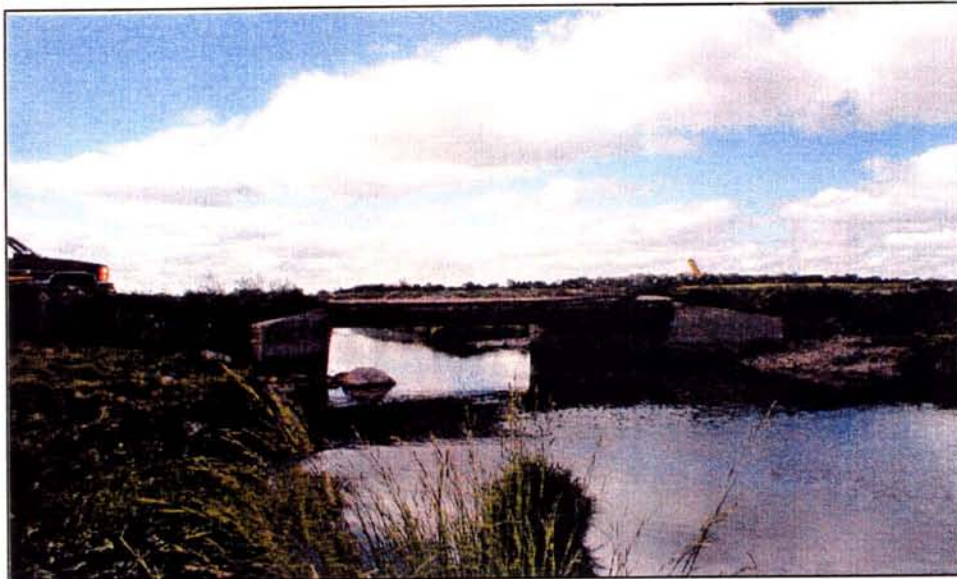
B8 Downstream side of concrete bridge, in good condition, 4.7 feet of water, (8-18-99), Section 8 & 17, T159N, R67W, N 586713.53, E 2284853.60, Elevation 1523.7 @ ∇ of coulee.



B8 Center of bridge in good condition, looking east, 25.5' wide & 36' long, Section 8 & 17, T159N, R67W, N 586725.44, E 2284847.46, Elevation 1536.6 @ center of bridge, top of gravel.



B9 Upstream side of concrete bridge, in poor condition, 2.8 feet of water, (8-18-99), Section 7 & 8, T159N, R67W, N 591588.03, E 2280413.43, Elevation 1533.6 @ Φ of coulee.



B9 Downstream side of concrete bridge, in poor condition, 3.1 feet of water, (8-18-99), Section 7 & 8, T159N, R67W, N 591586.75, E 2280432.99, Elevation 1533.2 @ Φ of coulee.



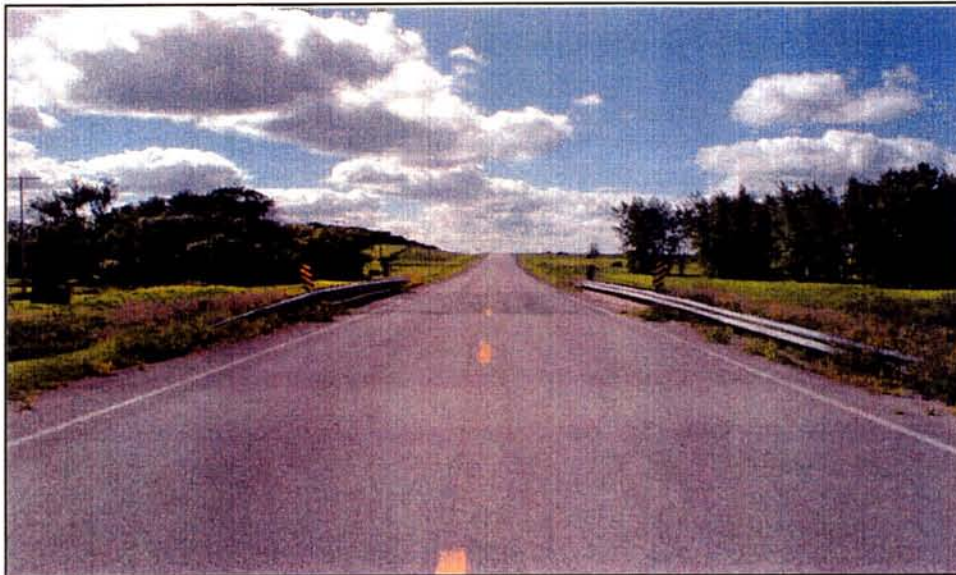
B9 Center of bridge in poor condition, looking north, 19.0' wide & 36.0' long, Section 7 & 8, T159N, R67W, N 591588.30, E 2280423.14, Elevation 1543.0 @ center of bridge, top of gravel.



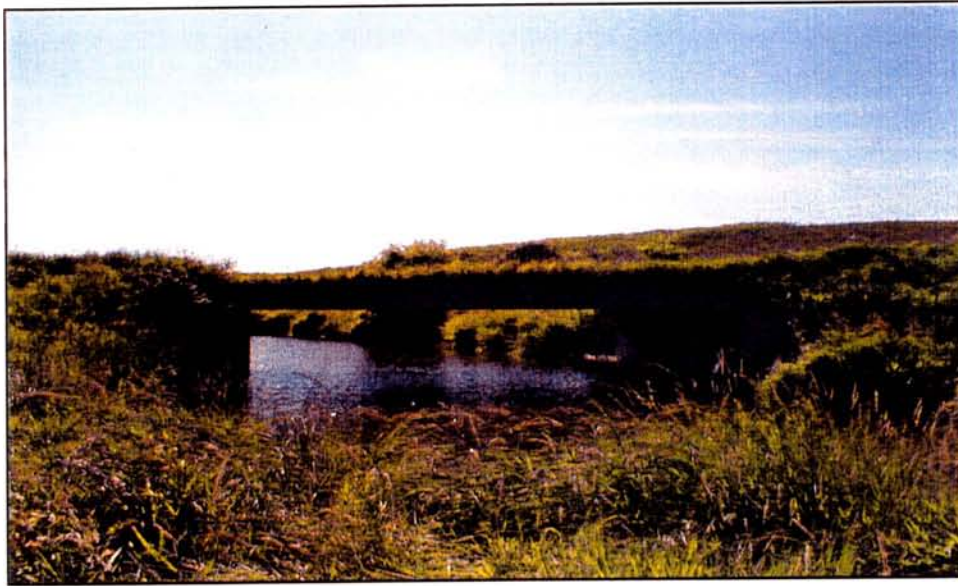
B10 Upstream side of concrete bridge, in good condition, on N.D. Hwy. 66, 1.2 feet of water, (8-18-99), Section 31 & 6, T159 & 160N, R67W, N 597191.08, E 2275762.21, Elevation 1546.0 @ Φ of coulee.



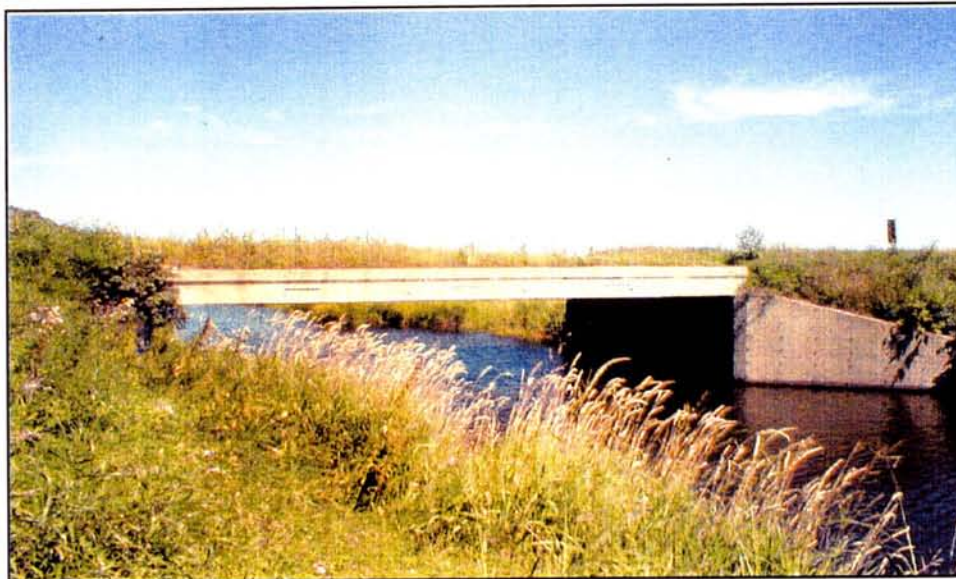
B10 Downstream side of concrete bridge, in good condition, on N.D. Hwy. 66, 1.7 feet of water, (8-18-99), Section 31 & 6, T159 & 160N, R67W, N 597159.42, E 2275795.79, Elevation 1545.5 @ ∇ of coulee.



B10 Center of bridge looking west, in good condition, 32' wide & 64' long, Section 31 & 6, T159 & 160N, R67W, N 597175.87, E 2275775.10, Elevation 1558.0 @ center of bridge & N.D. Hwy. 66.



B11 Upstream side of concrete bridge, in good condition, 4.8 feet of water, (8-19-99), Section 19 & 30, T160N, R67W, N 607764.04, E 2276065.88, Elevation 1571.5 @ ∇ of coulee.



B11 Downstream side of concrete bridge, in good condition, 5.6 feet of water, (8-19-99), Section 19 & 30, T160N, R67W, N 607739.03, E 2276066.58, Elevation 1570.8 @ ∇ of coulee.



B11 Center of bridge in good condition, looking west, 25.7' wide & 36' long, Section 19 & 30, T160N, R67W, N 607751.23, E 2276066.49, Elevation 1585.1, @ center of bridge, top of gravel.



B12 Upstream side of double cell 7 foot high box culvert, in good condition, 0.3 foot of water, (8-19-99), Section 24 & 19, T160N, R67W & R68W, N 609347.395, E 2275034.76, Elevation 1579.2 @ center of coulee.



B12 Downstream side of double cell 7 foot box culvert, in good condition, 0.2 foot of water (8-19-99), Section 24 & 19, T160N, R67 & 68W, N 609346.89, E 2275087.48, Elevation 1579.3 @ ∇ of coulee.



B12 Center of road crossing of 55' wide & 17.5' long box culvert, in good condition, looking north, Section 24 & 19, T160N, R67 & 68W, N 609347.54, E 2275061.08, Elevation 1591.7 @ center of road crossing, top of gravel.



B13 Upstream side of double cell box 8' culvert, in good condition, 2.6 feet of water (8-19-99), Section 13 & 24, T160N, R68W, N 613022.80, E 2273190.59, Elevation 1583.9 @ ∇ of coulee.



B13 Downstream side of double cell 8 foot box culvert, in good condition, 2.9 feet of water (8-19-99), Section 13 & 24, T160N, R68W, N 612974.46, E 2273198.45, Elevation 1583.6 @ ∇ of coulee.



B13 Center of road crossing of 50' wide & 16.6' long box culvert, in good condition, looking west, Section 13 & 24, T160N, R68W, N 612998.71, E 2273194.42, Elevation 1594.3 @ center of road crossing, top of gravel.



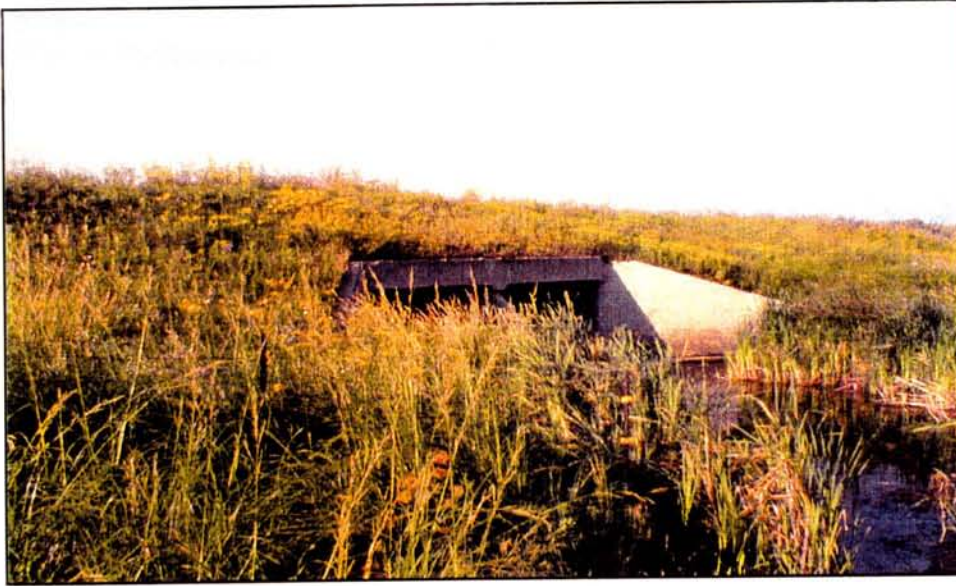
B14 Upstream side of double cell 9 foot box culvert, in good condition, 1.9 feet of water (8-19-99), Section 1 & 2, T160N, R68W, N 626600.10, E 2269511.25, Elevation 1614.2 @ ∇ of coulee.



B14 Downstream side of double cell 9 foot box culvert, in good condition, 1.9 feet of water (8-19-99), Section 1 & 2, T160N, R68W, N 626573.95, E 2269556.15, Elevation 1614.2 @ ∇ of coulee.



B14 Center of FAS road crossing of 53' wide & 19.5' long box culvert, in good condition, looking north, Section 1 & 2, T160N, R68W, N 626585.97, E 2269533.71, Elevation 1627.4 @ center of road crossing, top of gravel.



B15 Upstream side of double cell 7 foot box culvert, in good condition, 0.2 foot of water (8-20-99), Section 31 & 2, T160 & 161N, R68W, N 628771.95, E 2269075.93, Elevation 1620.6.



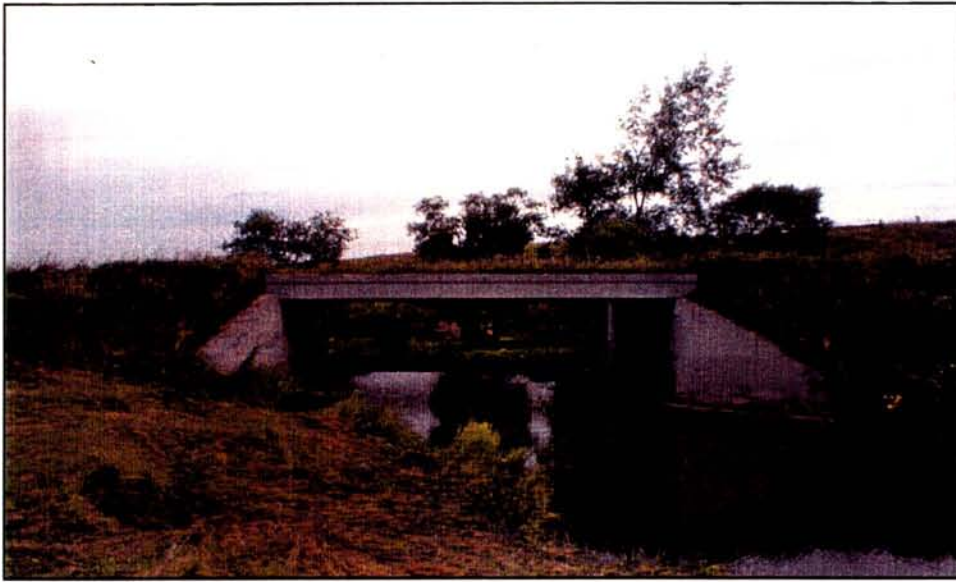
B15 Downstream side of double cell 7 foot box culvert, in good condition, 0.2 foot of water (8-20-99), Section 31 & 2, T160 & 161N, R68W, N 628696.38, E 2269077.91, Elevation 1620.6.



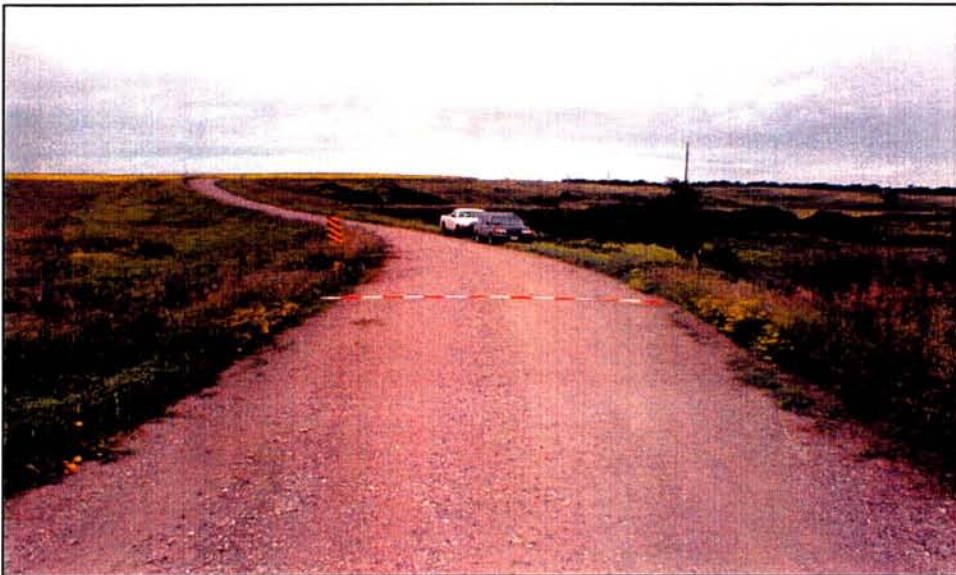
B15 Center of FAS road at 78' wide & 22' long box culvert, in good condition, looking west, Section 31 & 2, T160 & 161N, R67 & 68W, N 628730.54, E 2269079.71, Elevation 1636.8 @ center of road crossing, top of gravel.



B16 Upstream side of concrete bridge, in good condition, 3.2 feet of water (8-20-99), Section 30 & 31 , T161N, R67W, N 634001.33, E 2267896.40, Elevation 1632.0 @ Φ of coulee.



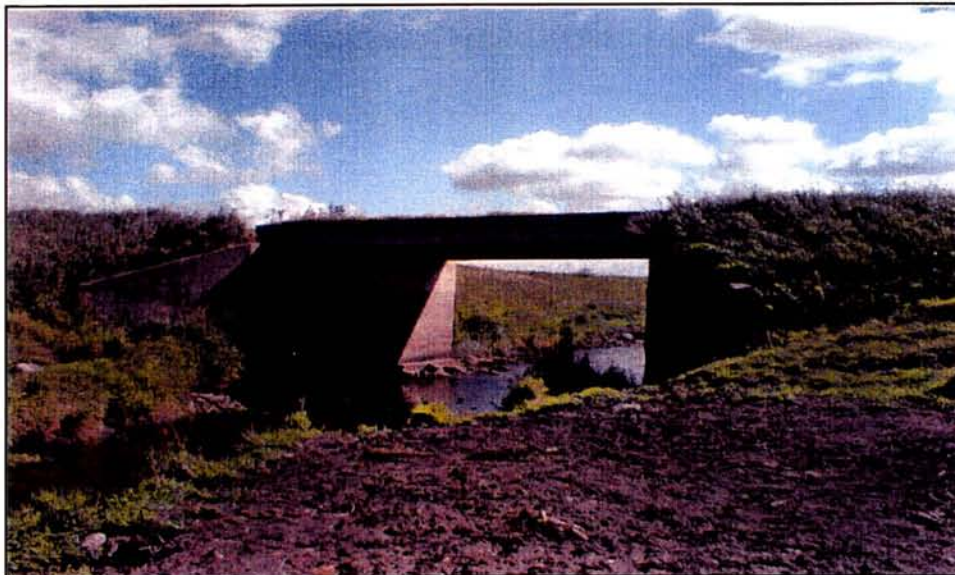
B16 Downstream side of concrete bridge, in good condition, 2.8 feet of water (8-20-99), Section 30 & 31, T161N, R67W, N 633975.66, E 2267896.38, Elevation 1632.3 @ Φ of coulee.



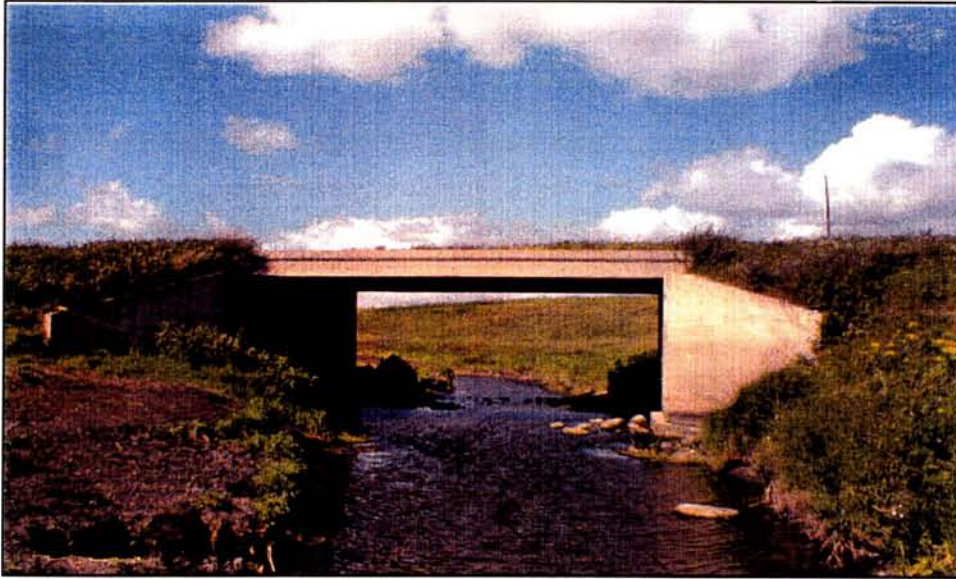
B16 Center of bridge in good condition, looking west, 25.7' wide & 31.0' long, Section 30 & 31, T161N, R67W, N 633988.51, E 2267896.48, Elevation 1646.8 @ center of bridge and top of gravel.



B17 Center of low-water crossing looking west, in fair condition, elevation taken at later date, county filled in crossing (8-20-99), Section 24 & 25, T161N, R67W, N 639210.86, E 2265906.90, Elevation 1649.9 @ center of crossing, top of gravel.



B18 Upstream side of concrete bridge, in fair condition, 0.4 foot of water (8-23-99), Section 14 & 23, T161N, R68W, N 644493.07, E 2261322.32, Elevation 1665.9 @ Φ of coulee.



B18 Downstream side of concrete bridge, in fair condition, 1.5 feet of water (8-23-99), Section 14 & 23, T161N, R68W, NN 644467.305, E 2261322.76, Elevation 1664.9 @ ∇ of coulee..



B18 Center of bridge in fair condition, looking east, 25.7' wide & 31.0' long, Section 14 & 23, T161N, R68W, N 644480.40, E 2261322.55, Elevation 1681.0 @ center of bridge, top of gravel.



B19 Upstream side of concrete bridge, in fair condition, 4.2 feet of water (8-23-99), Section 11 & 14, T161N, R68W, N 649692.15, E 2256206.44, Elevation 1685.9 @ ∇ of coulee.



B19 Downstream side of concrete bridge, in fair condition, 3.6 feet of water (8-23-99), Section 11 & 14, T161N, R68W, N 649674.21, E 2256206.85, Elevation 1686.5 @ ∇ of coulee.



B19 Center of bridge looking east, in fair condition, 17.7' wide & 48.0' long, N 649683.44, E 2256206.39, Elevation 1698.7 @ center of bridge, top of gravel.



B20 Upstream side of concrete bridge, in fair condition, 4.2 feet of water (8-23-99), Section 3 & 10, T161N, R68W, N 654919.44, E 2252191.87, Elevation 1704.0 @ Φ of coulee.



B20 Downstream side of concrete bridge, in fair condition, 4.8 feet of water (8-23-99), Section 3 & 10, T161N, R68W, N 654896.97, E 2252191.87, Elevation 1703.5 @ Φ of coulee.



B20 Center of bridge looking east, in fair condition, 22.5' wide & 31.0' long, Section 3 & 10, T161N, R68W, N 654908.26, E 22152191.76, Elevation 1717.6 @ center of bridge, top of gravel.



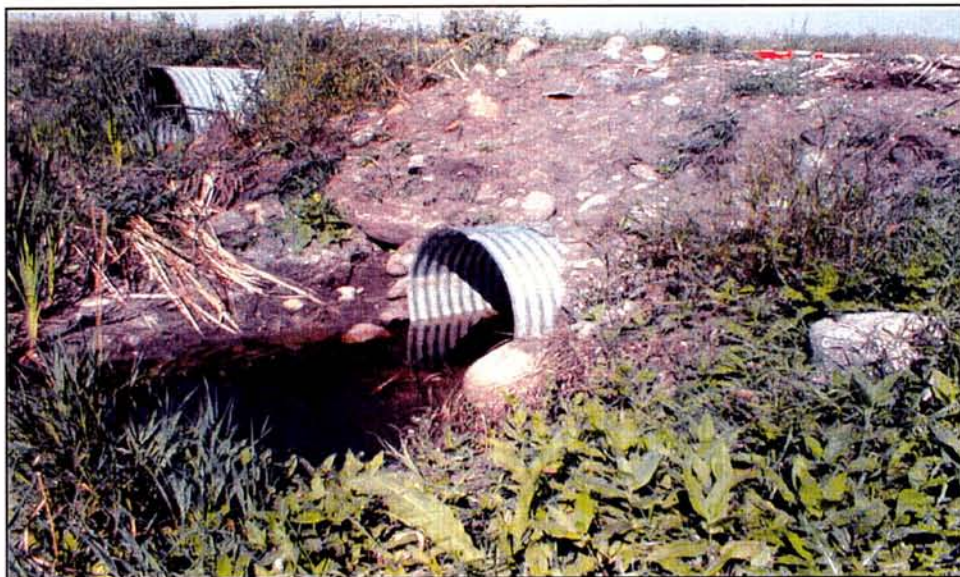
B21 Upstream side of double cell 8' high box culvert, in good condition, 3.0 feet of water (8-24-99), Section 3 & 4, T161N, R68W, N 656186.17, E 2250702.14, Elevation 1710.8 @ ∇ of coulee.



B21 Downstream side of double cell 8' high box culvert, in good condition, 2.9 feet of water (8-24-99), Section 3 & 4, T161N, R68W, N 656154.38, E 2250755.03, Elevation 1710.8 @ ∇ of coulee.



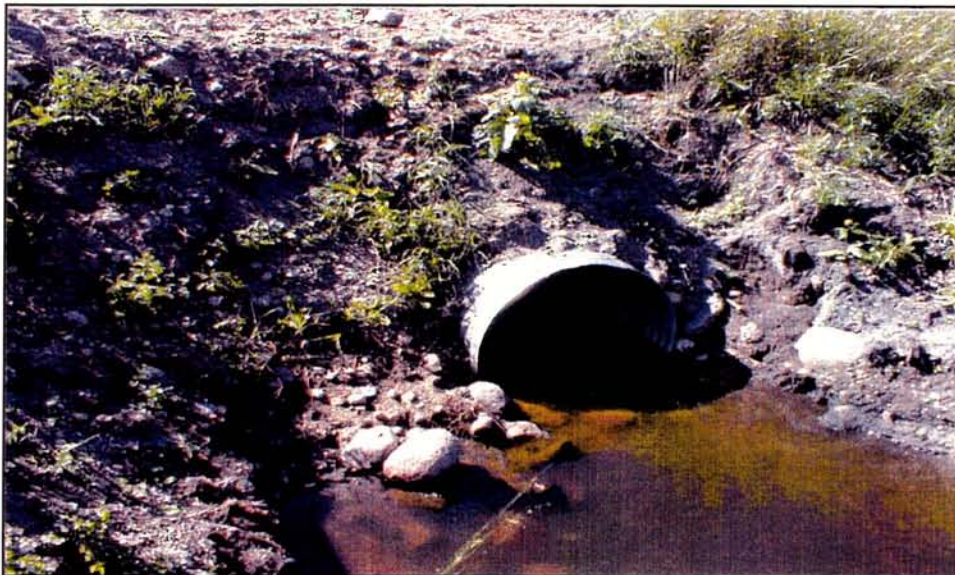
B21 Center of FAS road crossing of 63.0' wide & 20.0' long box culvert looking north, in good condition, Section 3 & 4, T161N, R68W, N 656170.15, E 2250728.28, Elevation 1723.0 @ center of FAS road crossing, top of gravel.



B22 Upstream side of 36" CMP', in good condition, looking from south to north, 1.6 foot of water, (8-24-99), Section 1 & 6, T161N, R69 & 68W, N 655635.48, E 2234918.50, Elevation 1749.2 @ invert of 36" CMP.



B22 Upstream side of 54" CMP, in good condition, no water, (8-24-99), Section 1 & 6, T161N, R69 & 68W, N 655652.40, E 2234918.24, Elevation 1750.2 @ invert of 54" CMP.



B22 Downstream side of 36" CMP, in good condition, 0.9 foot of water, (8-24-99), Section 1 & 6, T161N, R69 & 68W, N 655635.83, E 2234957.57, Elevation 1749.4 @ invert of 36" CMP.



B22 Downstream side of 54" CMP, in good condition, 2.3 feet of water, (8-24-99), Section 1 & 6, T161N, R69 & 68W, N 655652.12, E 2234956.46, Elevation 1749.6 @ invert of 54" CMP.



B22 Center of road crossing looking north, of one 36" CMP, 40' long and one 54", 40.5' long, in good condition, Section 1 & 6, T161N, R69 & 68W, N 655644.31, E 2234939.87, Elevation 1755.5 @ center of gravel road crossing, top of gravel.

Bench Marks Used
Datum NAD 83

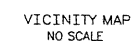
	Designation	Latitude	Longitude	Ellipsoid Height	Description
1	BM GROAT	48° 20' 23.25880"N	99° 00' 23.11876"W	1403.69	NGS Cap
2	BM 3 DFC 1956	48° 18' 37.94674"N	99° 05' 33.03632"W	1377.78	USGS Cap
3	BM B 66 1984	48° 23' 58.38426"N	99° 11' 58.43396"W	1385.47	NGS Cap
4	BM D 66 1934	48° 27' 27.83861"N	99° 12' 00.19493"W	1381.87	NGS Cap
5	TBM 98-1	48° 26' 34.95538"N	99° 05' 56.75372"W	1386.00	Rebar/Cap
6	BM SWEDE	48° 30' 03.05741"N	99° 06' 42.45998"W	1401.08	NGS Cap
7	TBM 98-2	48° 36' 08.47191"N	99° 13' 17.53440"W	1447.68	Rebar/cap
8	BM P 61 1934	48° 37' 48.82847"N	99° 13' 56.41696"W	1453.46	NGS Cap
9	TBM 98-3	48° 39' 38.34574"N	99° 12' 12.62688"W	1452.78	Rebar/Cap
10	BM N 61 1934	48° 37' 48.66200"N	99° 12' 33.86965"W	1442.78	NGS Cap
11	TBM 98-4	48° 34' 25.58561"N	99° 18' 06.48955"W	1443.30	Rebar/Cap
12	BM N 66 1934	48° 37' 26.79701"N	99° 22' 31.38644"W	1516.39	NGS Cap
13	BM BISBEE 1968	48° 37' 52.90900"N	99° 22' 51.27111"W	1528.65	NGS Cap
14	BM R 61 1934	48° 37' 46.90062"N	99° 19' 09.16736"W	1481.87	NGS Cap
15	BM RICHARD 1968	48° 43' 56.66863"N	99° 15' 48.79778"W	1492.38	NGS Cap
16	BM T 66 1934	48° 43' 39.49910"N	99° 28' 01.34032"W	1655.47	NGS Cap
17	BM PERTH	48° 45' 31.17816"N	99° 30' 14.20818"W	1690.75	NGS Cap
18	BM X 66 1934	48° 49' 01.41835"N	99° 34' 11.64488"W	1712.88	NGS Cap
19	BM P 176 1935	48° 47' 26.45676"N	99° 26' 19.09189"W	1652.38	NGS Cap

* Bold numbering is current survey control held.













Bench Marks Used
Local Coordinates
Datum NAD 27 & NGVD 29

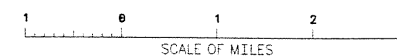
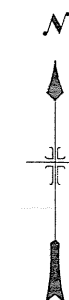
	Designation	Northing	Easting	Elevation	Description
1	BM GROAT	492239.233	2363339.576	1469.03	NGS Cap
2	BM 3 DFC 1956	481174.855	2342601.232	1445.68	USGS Cap
3	BM B 66 1984	513182.730	2316005.153	1461.41	NGS Cap
4	BM D 66 1934	534402.746	2315527.772	1460.13	NGS Cap
5	TBM 98-1	529474.584	2340118.334	1459.44	Rebar/Cap
6	BM SWEDE	550503.581	2336656.820	1477.36	NGS Cap
7	TBM 98-2	587068.460	2309439.165	1520.82	Rebar/cap
8	BM P 61 1934	597194.132	2306658.655	1526.45	NGS Cap
9	TBM 98-3	608407.419	2313442.926	1525.93	Rebar/Cap
10	BM N 61 1934	597269.406	2312203.339	1515.96	NGS Cap
11	TBM 98-4	576330.688	2290182.657	1518.14	Rebar/Cap
12	BM N 66 1934	594424.229	2272101.735	1589.02	NGS Cap
13	BM BISBEE 1968	597050.933	2270727.100	1601.26	NGS Cap
14	BM R 61 1934	596664.795	2285654.809	1554.69	NGS Cap
15	BM RICHARD 1968	634344.244	2298511.938	1565.84	NGS Cap
16	BM T 66 1934	631880.530	2249429.784	1726.63	NGS Cap
17	BM PERTH	643080.498	2240375.614	1761.54	NGS Cap
18	BM X 66 1934	664187.433	2224209.502	1783.09	NGS Cap
19	BM P 176 1935	654973.140	2255967.600	1723.63	NGS Cap

* Bold numbering is current survey control held.



LEGEND OF SYMBOLS

- | | | | |
|---|----------------------|---|-------------------------|
|  | Road, Heavy Duty |  | Crossing Location |
|  | Paved Road |  | Primary Survey Control |
|  | Improved Gravel Road |  | Base Line Control Point |
|  | Unimproved Road |  | Slough |
|  | Township Line | | |
|  | Section Lines | | |
|  | Railroad Tracks | | |
|  | Stream | | |



⊕ ALWAYS THINK *SAFETY*

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
PICK-SLOAN MISSOURI BASIN PROGRAM
GARRISON DIVISION GARRISON DIVERSION UNIT, N.DAK.

DEVILS LAKE BASIN

LOCATION MAP

DESIGNED J. THORNBURG CHECKED S. JACOBSON

DRAWN J. THORNBURG TECH. APPR _____

APPROVED

CADD SYSTEM	CADD FILENAME	DATE AND TIME PLOTTED
ACAD 14.6	Q15765.DWG	89-09-99 1:09 PM
BISMARCK, N. DAK.	SEPTEMBER 29, 1999	769-603-2293

